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number of Tunes be encereas'd; the Calculation of which (tho much more intricate and operose) would be equally attainable by our Theorem.

III. *Of Ossifications or Petrifications in the Coats of Arteries, particularly in the Valves of the Great Artery, by William Cowper, Surgeon, and F. R. S.*

HOW far Anatomical Enquiries inform in the true causes of Diseases, which have been ascribed to the want of Spirits in some, and Radical Moisture in Aged People, &c. may be in some measure seen by two Observations, among others, publisht in the Transactions No 280: The first there mentioned, pag. 1195, is of a young Gentlewoman; in whom the *Parietes*, or Membranes, that compose the Trunks of the Arteries of the Arm near the *Axilla*, being very much thickened, so that the *Diameter* of its Bore was lessened to more than a third part of its natural size; insomuch that a part of the Trunk of the Artery cut Transversel very much resembled a bit of the stem of a Tobacco-pipe, its sides were so thick, and its Bore consequently so much lessened: The other was of the Trunks of the Arteries of the Leg, pag. *ib.* that were Obstructed by Petrifications or Ossifications, in a person about the 67th year of his Age. Since which I have met with several of the like Instances in people of years, particularly in the Leg of an old Gentleman, whose Toes and Foot were Sphacelated, the Arteries of whose Leg I have still by me, and have sent them herewith Injected, as much as they could be, with Red Wax; in which the Ossifications diminishing their Channels in some places, and totally obstructing them in others,

others, is made very evident. (See the Preparation in the *Repository* of the *Royal Society*.)

The Dissections of Morbid Bodies not only instruct us in the Seats and Causes of Diseases, but very often inform us in the true Use of parts, as will appear by the following Instances.

The Ossification or Petrification in the Great Artery, at its rise from the Heart, has been so commonly found, that some think it is constant; how it may be in some Animals I cannot be certain, but in Humane Bodies I am well assured whenever it happens it is a Disease, and does in some measure incommode those parts in the due execution of their office, as the following Cases will evidence: But that this Paper may be of some use, I shall set down the Symptoms before Death, which may help our Conjectures when the like offers again. A spare man about 30, who languisht with an Ulcer in the Thigh, attended with a *Caries*, or Rottenness of that Bone at its Articulation with the *Tibia* and *Patella* call'd the Knee, where all those Bones were affected, at length fell into a true *Phthisis*, and coughed up no small quantity of *Pus*; some months before his Death I frequently saw him, when he would often offer me his Wrist, to feel his unequal Pulse, which was wont to amuse him; the Artery there missing sometimes one, sometimes two strokes in 6 or 7: At first he told me he observed it mist but one in ten, but at length those stops became more frequent, especially on any agitation of the Body or Mind: tho a *Polypus* in any of the Great Vessels about the Heart may induce that Symptom, yet the continuance of it so long before Death, shews it owing to some other Cause, as appear'd on opening the Heart and Great Artery of this person. A A A D G. Fig. 1st.

You will not be surprized I send the Figures printed from Copper Plates, when I tell you they are designed, among others (I am now about) to explain the Muscles,

in another Edition of my *Myotomia Reformata*, this Fig. the 1st being one of those that represent the Muscular Structure of the Heart; the rest I have added to explain the Petrification of the Valves of the *Aorta* in the following instance.

Fig. 1.

A A. The Trunk of the Great Artery opened and display'd.

a a. The three Semilunary Valves of the *Aorta*, which hinder the Blood from returning to the Heart, after it is expell'd thence by its *Systole* or Contraction; these Valves in this case were somewhat thicker, and not so pliable as naturally, and did not so adequately apply to each other, as is express'd Fig. 4. a a a. Whence it hapned sometimes, that the Blood in the Great Artery (A A A. Fig. 1.) would recoil, and interrupt the Heart in its *Systole*. But this stubbornness of these Valves was owing to a Bony or stony body, markt b. Fig. 1st, which appear'd much plainer when the Valves were dry, a is represented in the Figure beneath, markt with an * : a a. the two Valves pinn'd out and dry'd, b the Petrification or stony Body at their junction. In this Instance I observ'd the Left Ventricle of the Heart, express'd at G G. D D. e e. 1st Fig. 1st, to be a little dilated from its natural size, but was not by two parts in three so big as the Left Ventricle of the Heart of one I dissected in the Presence of Dr *Sloane*. The Symptoms, some years before the Death of this person, who was about 40 years of Age, were extraordinary Shortness of Breath, especially on any fatigue, with an intermission of one stroke in three of the Pulse; his posture of sitting up was more Eligible than any other. he complain'd of great faintness, and now and then pain about the Heart; the extreme parts often cold, which towards his Death increased more and more on him; his Legs and Arms being Gangreen'd some hours before; insomuch that the Corps was very offensive in opening, tho' it was done within 24 hours after he expired, in the month of *November*. Upon

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Upon opening the Chest, the Heart, particularly its Left Ventricle, was found larger than that of an ordinary Ox, and fill'd with coagulated Blood. The Valves of the Great Artery A A. Fig. 1. were Petrify'd, insomuch that they could not approach each other, as express'd Fig. 2. and 4. But an Orifice, represented at Fig. 5, remain'd always open by the Petrifications b b, Fig. 3. and a a, Fig. 5, which had clogg'd these Valves, and hindered their application to each other, as in a Natural state is represented in Fig. 2 and 4, a a a.

The explication of the Symptoms in both these Cases is obvious enough ; for tho' the Person first instanced did not dye of the same disease with the last mentioned, yet the Symptoms in his Illness plainly shewed what must follow, from the disorders of these *Valves*, as they are rendred more or less useless : For as their Office is to prevent the return of the Blood into the Heart, in its *Diastole*, by exactly shutting up the passage of the *Aorta* (as the Flaps in Water Engines) so if by any accident they are hinder'd from doing their duty, as they were by the Petrifications mentioned, the consequences must be, not only a regurgitation of Blood into the Heart, but they baulk its impulsive force, when the Muscular Fibres (which are in these Valves) cannot contract to prepare the passage for the Blood of the Left Ventricle, when to be expelled into the *Aorta*. Hence the Intermissions of the Pulse in the first instance may be accounted for. In the latter instance, these Valves were wholly useless, the Circulation became more difficult, as appear'd by the refrigeration of the extreme parts, Gangreens, &c. In both these cases the Left Ventricle of the Heart was dilated proportionably to the ill constitution of these Valves, which clearly shews these Valves give that assistance to the Heart in its Office that it cannot be without, and that it gradually suffers according to their indisposition.

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Before these Papers were sent to the Press, I had an opportunity of observing a like Instance of that first mention'd in this latter part of them. It was an Elderly Gentleman, about 72, who had sometimes Intermissions in his Pulse several years before his death, in whom I found divers Petrifications in the Mitral and Semilunary Valves of the Left Ventricle of the Heart.

If my time would give leave, I might here add some Anatomical remarks on the Structure and Mechanism of this noble Organ, particularly of the Use of that Transverse Tendon express'd at ff. Fig. 1. and the Progress and Insertions of the Tendons f. Fig. 3, arising from the *Carnea Columna* ee, which do not all terminate in the lower Margin of the Mitral Valve d, Fig. 2 and 3, but pass to the upper and middle part of that Valve, whilst others terminate in the Basis of the Heart, with the Muscular structure of the Semilunary Valves; but these I must reserve for another place.

The Explanation of the Figures.

Fig. 1.

The Left Ventricle of the Heart open'd, &c.

AAA. The inside of the *Aorta* slit open to the Left Ventricle.

BB. The Bulbous Trunk of the *Vena Pulmonalis* divided through, and pinn'd aside to shew

a a a. The three Semilunary Valves of the *Aorta*, which hinder the Blood from returning to the Heart.

b. A small Stony Body at the conjunction of two of the Semilunary Valves, express'd at the * below this Figure.

a a. Parts of the two Valves dried.

b. The Petrification, as it appears in the dried Valves.

C. Part of the lower Trunk of the *Vena Cava*, cut off immediately above the Liver.

c c c. The Left Auricle open'd and pinn'd out.

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DD The sides of the Left Ventricle divided and drawn aside, to shew its inside d d e e f f G G.

d d. The Mitral Valves of the Left Ventricle of the Heart or *Arteria Pulmonica* divided and turn'd aside.

e e. The *Carneæ Columnæ*, whence spring the Tendons fasten'd to the Valves, d d, express'd Fig. 3 d f.

f f. A Transverse Cord or Tendon, by which the *Columnæ Carneæ* are drawn nearer each other in the *Systole*, or contraction of the Heart, when the Blood is expell'd into the *Aorta*; whereby the Tendons (express'd f f Fig: 3 and 5) draw the Mitral Valve laterally; by which means its Orifice g c. Fig. *ibid*, is not only closed to prevent the return of the Blood by the *Vena Pulmonalis*, but at the same time it opens a passage for the Blood of the *Arteria Magna*, by withdrawing the Mitral Valve, d Fig. 2. from the Orifice of the *Aorta*, a a a g. Tho this Artifice in Nature may be indifferently explain'd by these Figures; yet I have design'd some others, that I think will make it more intellegible in another place.

GG. The Internal Surface of the Left Ventricle where it is somewhat smoother as it leads to the *Aorta*.

g g. The Trunk of the Coronary Vein divided when filled with Wax.

h h. The Coronary Artery in like manner divided.

i. One of the Trunks of the *Vena Pulmonalis*.

k k k. The three Orifices of the Trunks of the *Vena Pulmonalis*, as they open into the Bulbous Trunk, express'd at B B.

H. The Cone of the Heart.

Fig. 2

A. Part of the *Aorta* next the Heart.

a a a. The three Semiluminary Valves, as they appear next the Heart in a Natural State, when the Heart is in *Diastole*, and the Blood hinder'd by these Valves from returning to its Left Ventricle.

b b. Part of the Basis of the Heart cut off.

e e. The

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e e. The two *Columnæ Cornea* of the Left Ventricle.

d. The Mitral Valve.

ff. The Tendons Springing from the *Carnea Columnæ*, and inserted into the upper and middle parts of the Valve, as well as to its lower Margin; which is better exprest in the following Figure.

g. The Orifice of the *Aorta* compleatly clos'd by the application of these three Valves to each other.

Fig. 3.

Shewsthe same parts exprest in the preceding Figure, as they appear'd when the Valves of the *Aorta* were Petrified: The same Letters also directing to the parts already explain'd, except a.

a. Part of one of the Valves which was not cover'd with the Petrification.

b b b. The Petrifications on the rest of the Valves.

† A small Petrification on the Mitral Valve:

h h h. Some of the Transverse Tendons which draw the *Carnea Columnæ* to each other, when the Heart is in *Systole*, for the more effectual closing the Orifice of the Mitral Valve, exprest here at g.

Fig. 4 and 5.

Shews the same parts represented in the two preceding Figures, as they appear view'd towards the Heart, when dry'd and display'd.

A A. The Trunk of the *Aorta*.

a a a. Fig. 4. The Semilunary Valves in a Natural State, when the Blood in the Arteries presses them close to each other.

b b b b. The Trunks of the two Coronary Arteries cut off.

a a. Fig. 5 The Semilunary Valves Petrify'd.

c. The Orifice of the Mitral Valve next the *Vena Pulmonalis*.

d d d.

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d d d. The Internal Surface of the Mitral Valve leading into the Left Ventricle.

e e e. The *Columnæ Carnee*:

f f. Their Tendons.

g g. The Transverse Tendons which draw the Fleſhy Columns to each other when the Heart is in *Systole*.

IV. *An Account of a Dropsical Body dissected by Mr John Lafage.*

S I R,

I Was called, some time ago, to open a Maiden Lady 52 years of age, who complain'd, about six weeks before, of a Circonscript hard Swelling on the *Hypogastrica regio*, on the Right side; from that time her Belly grew by degrees to an exorbitant bigness, the great weight whereof was the most considerable Symptom, and at last suffocated the Lady. The Body was mightily emaciated, and the Legs swelled few days before her death.

I expected Water, but there was only a viscuous darkish Humour, to the quantity of 18 Gallons; after the evacuation of that matter, I was no less surprized to perceive a large heap of Vesicles arising from a thick Membrane covering the Guts, it being the *Peritoneum* separated from the Muscles: I took it out, to examine the better those Vesicular Bodies disposed on the outward surface of that Membrane, as also them that were on its inside, towards the Guts. The Vesicles were of different magnitude; some of the largest had been broken and sunk, others were broken and almost empty, and the others very much distended and full; the matter of all of them was of the

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same

Fig: 2.



Fig: 4.

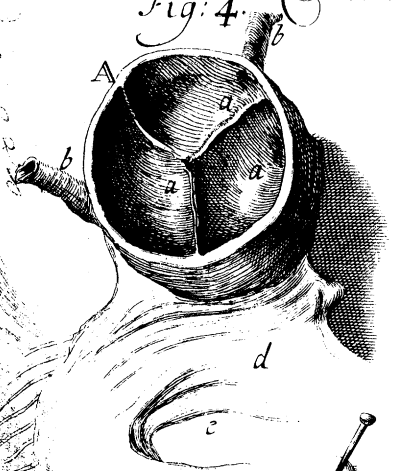
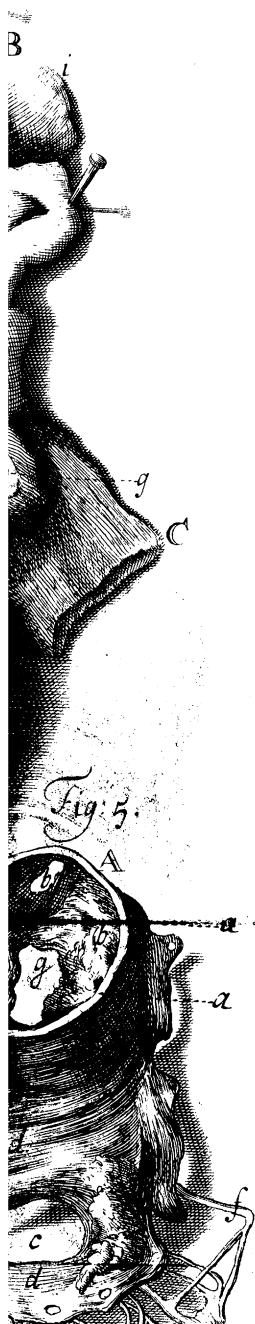


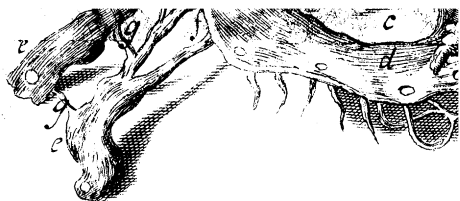
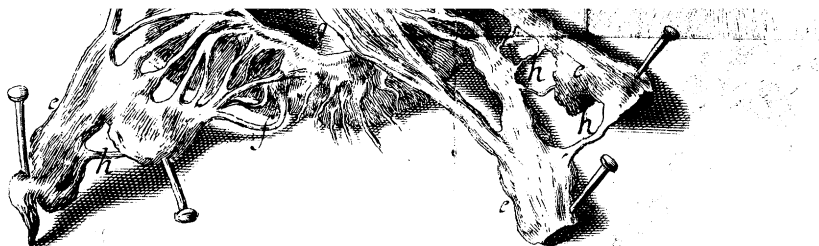
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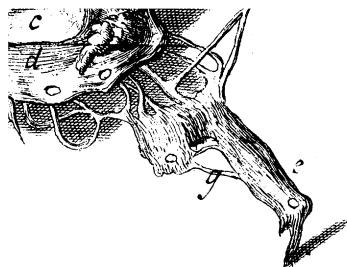


Fig: 3.









M. V. 2^r Gucht Sculp.

